

**ERRATA SHEET FOR FIRST AND SECOND PRINTING OF
ANSI/ASHRAE/IESNA STANDARD 90.1-1999 (SI edition)
Energy Standard for Buildings Except Low-Rise Residential Buildings**

May 21, 2002

The corrections listed in this errata sheet apply to the first and second printing of ASHRAE/IESNA Standard 90.1-1999, SI edition. The outside back cover marking identifying the first printing is “GG 1/00” and is “GG 1/01” for the second printing. The shaded items have been added since the previous published errata sheet dated December 15, 2001 was distributed and since the ANSI approved version of the standard (second printing) was printed in January 2001. Erratum identified with an asterisk “*” have already been incorporated into the editions printed January 2001 (GG 1/01) and later.

NOTICE: ASHRAE now has a list server for Standing Standards Project Committee 90.1 (SSPC 90.1). Interested parties can now subscribe and unsubscribe to the list server and be automatically notified via e-mail when activities and information related to the Standard and the User’s Manual is available. To sign up for the list server please visit **Standards List Servers** on the Standards and Codes section of the ASHRAE website at <http://www.ashrae.org/STANDARDS/listservers.htm>.

Page Erratum

- Cover John K. Holton was incorrectly identified as a member of voting status (*) when
* the document was approved for publication.
- 15* **Section 4.1.2.2(b).** In the last sentence, the term “design professional” should be
in italics.
- 22* **Table 5.3.2.3.** In the second column of the header, replace “All Orientations”
with “All Other Orientations”.
- 26 **Table 6.2.1A, Electrically Operated Unitary Air Conditioners and
Condensing Units-Minimum Efficiency Requirements:** In the second column
titled “Size Category”, Corresponding to “Air Conditioners, Water, and
Evaporatively Cooled” equipment type, change “>70 kW” to “≥70 kW”.
- 28 **Table 6.2.1B, Electrically Operated Unitary and Applied Heat Pumps -
Minimum Efficiency Requirements:** In the fifth column titled “Efficiency as
of 10/29/2001* ” for Water-Source (Cooling Mode), Groundwater-Source
(Cooling Mode), and Ground-Source (Cooling Mode) equipment types, delete
the superscripted footnote reference to Section 12.
- 28 **Table 6.2.1B, Electrically Operated Unitary and Applied Heat Pumps -
Minimum Efficiency Requirements.** Under column 3, titled “Subcategory or

Rating Condition, rows 18 and 19, corresponding to **Equipment Type**, Air Cooled (Heating Mode), change “-8.3°C”, directly below “Outdoor Air”, to “-8.3°C db/-9.4°C wb Outdoor Air”. Under columns 4 and 5, row 18, Size Capacity ≥ 19 kW and < 40 kW (Cooling Capacity), corresponding to the “-8.3°C db/-9.4°C wb Outdoor Air”, add “2.0 COP_H” as the Minimum Efficiency and “2.2 COP_H” as the Efficiency as of 10/29/2001. Under columns 4 and 5, row 19, Size Category ≥ 40 kW (Cooling Capacity), corresponding to the “-8.3°C db/-9.4°C wb Outdoor Air”, add “2.0 COP_H” as the Minimum Efficiency and “2.0 COP_H” as the Efficiency as of 10/29/2001.

- 29 **TABLE 6.2.1C, Water Chilling Packages-Minimum Efficiency Requirements.** In footnote “*” change “ $\leq 4.41.7$ °C” to “ ≤ 4.4 °C”.
- 31* **Table 6.2.1F.** Second column; rows 2, 6, and 9. The “<” symbol preceding 88 kW should be replaced with “ \geq ”.
- Table 6.2.1F. Third column; rows 3, 7, and 10: insert “Minimum Capacity***” below existing text “Maximum Capacity***”. Fourth column; rows 3, 7 and 10: insert “80% E_c”, “83% E_c”, and “83% E_c”, respectively, to correspond with the “Minimum Capacity***” text in the third column.
- 33 **Table 6.2.1I, COPs and IPLVs for Non-Standard Centrifugal Chillers <528kW, £1055 kW:** In the title and in the first row of the table, replace “<528 kW,” with “ ≥ 528 kW,”.
- 37 **Table 6.2.4.2A, Minimum Duct Insulation R-Value,* Cooling and Heating Only Supply Ducts and Return Ducts:** In the first column titled “**Envelop Criteria Table**”, change “Envelop” to “Envelope” in the title and change the envelope table designations from “5-1 through 5-26” to “B-1 through B-26”.
- 38 **Table 6.2.4.2B, Minimum Duct Insulation R-Value,* Combined Heating and Cooling Ducts:** In the first column titled “**Envelop Criteria Table**”, change the envelope table designations from “5-1 through 5-26” to “B-1 through B-26”.
- 37 **Table 6.2.4.2A, Minimum Duct Insulation R-Value,^a Cooling and Heating Only Supply Ducts and Return Ducts.** In the second row, sixth column, change the column heading from “Unvented Attic with Backloaded Ceiling” to “Unvented Attic Above Insulated Ceiling”.
- 38 **Table 6.2.4.2B, Minimum Duct Insulation R-Value,^a Combined Heating and Cooling Ducts.** In the second row, sixth column, change the column heading from “Unvented Attic w/ Backloaded Ceiling” to “Unvented Attic Above Insulated Ceiling”.
- 43* **Section 6.3.3.** In the third line, replace “6.3.3.3” with “6.3.3.2”.

- 43 **Exceptions to 6.3.2.1 Zone Controls.** In Exceptions to 6.3.2.1 (c) italicize the terms “site-recovered” and “site solar energy” and add a hyphen between the word “site” and “solar” as follows: “*site-recovered*” and “*site-solar energy*”.
- 44 **Section 6.3.3.1 Fan Power Limitation.** Following the Allowable Fan System Power equation change the term “Temperature Ratio = $(T_{t-stat} - T_s)/20$ (11.1)” to “Temperature Ratio = $(T_{t-stat} - T_s)/11.1$ ”.
- 47 **Table 7.2.2, Performance Requirements for Water Heating Equipment.** In column 4, titled “**Performance Required***”, rows 1 and 3, change “0.93-0.005V EF” to “0.93-0.00035V EF”. In rows 4 and 7 change “0.62-0.0072V EF” to “0.62-0.0005V EF”. In rows 10 and 13 change “0.59-0.0072V EF” to “0.59-0.0005V EF”.
- 47* **Table 7.2.2.** In the fifth column titled “Performance Required 10/29/2001”, in rows 3, 6, 7, 10,12,13,16, 18, and 19 (nine places), change the symbol “ $\sqrt{\quad}$ ” in each equation to a square root.
- 47 **Table 7.2.2, Performance Requirements for Water Heating Equipment.** In the third column titled **Subcategory or Rating Condition**, add “ ≥ 75.7 L” for electric resistance water heaters so that it reads “Resistance ≥ 75.7 L”.
- 49* **Section 9.2.1.2(a).** Replace “...for a space 1929 m² or less...” with “...for a space 929 m² or less...”.
- 58* **Section 11.4.1.** In the first sentence that reads, “The *budget building design* shall...”, change “11.4” to “11.3”.
- 58 **Section 11.4.1.** In the second sentence that reads, “Except as specifically instructed...”, change “11.3” to “11.4”. (This erratum applies only to those editions of the standard printed in January 2001, or later)
- 65 **TABLE A-2 (Section A2.3), Assembly U-Factors for Metal Building Roofs.** Under the second column titled “**Rated R-value of Insulation**”, in seven places, change the value “R-3.4” to “R-3.3” and in the third column titled “**Total Rated R-Value of Insulation**”, in one place, change the value “R-3.4” to “R-3.3”.
- 60* **Table 11.4.3A (continued), Note 1.** Replace “...with 0.74 W·L/s fan power” with “...with 0.74 W per L/s fan power”.
- 70* **TABLE A-6.** In the third column titled “Thickness in mm”, change values from 3 through 12 to 75 through 300, in 25 mm increments.
- 71* **TABLE A-7.** In the second row from the bottom of the table change the density from “125 2000” to “2000”.

- 74 **TABLE A-9 (Section A3.2), Assembly U-Factors for Metal Building Walls.** Under the second column titled “**Rated R-Value of Insulation**”, in one place, change the value “R-3.4” to “R-3.3”.
- 75 **TABLE A-10 (Section A3.3), Assembly U-Factors for Steel Frame Walls.** In the second column change the cavity insulation R-values as follows:
- Under the heading “Steel Framing at 400 mm OC” change
“R-1.94 (1.94)” to “R-1.9 (1.0)”
“R-2.29 (2.29)” to “R-2.3 (1.1)”
“R-2.65 (2.65)” to “R-2.6 (1.1)”
“R-3.35 (3.35)” to “R-3.3 (1.3)”
“R-3.70 (3.70)” to “R-3.7 (1.3)”
- Under the heading “Steel Framing at 600 mm OC” change
“R-1.94 (1.94)” to “R-1.9 (1.2)”
“R-2.29 (2.29)” to “R-2.3 (1.3)”
“R-2.65 (2.65)” to “R-2.6 (1.4)”
“R-3.35 (3.35)” to “R-3.3 (1.5)”
“R-3.70 (3.70)” to “R-3.7 (1.6)”
- 76 **TABLE A-11 (Section A3.4), Assembly U-Factors for Wood Frame Walls.** In the second column change the cavity insulation R-values as follows:
- Under the heading “Wood Studs at 400 mm OC” change
“R-1.94 (1.94)” to “R-1.9 (1.9)”
“R-2.29 (2.29)” to “R-2.3 (2.3)”
“R-2.65 (2.65)” to “R-2.6 (2.6)”
“R-3.35 (3.17)” to “R-3.3 (3.2)”
“R-3.70 (3.70)” to “R-3.7 (3.7)”
“R-3.35 (3.17)” to “R-3.3 (3.2)”
“R-3.70 (3.70)” to “R-3.7 (3.7)”
- Under the heading “Wood Studs at 600 mm OC” change
“R-1.94 (1.94)” to “R-1.9 (1.9)”
“R-2.29 (2.29)” to “R-2.3 (2.3)”
“R-2.65 (2.65)” to “R-2.6 (2.6)”
“R-3.35 (3.17)” to “R-3.3 (3.2)”
“R-3.70 (3.70)” to “R-3.7 (3.7)”
“R-3.35 (3.17)” to “R-3.3 (3.2)”
“R-3.70 (3.70)” to “R-3.7 (3.7)”
- 79 **TABLE A-14 (Section A5.3), Assembly U-Factors for Steel Joist Floors.** In the title of the first row, second column, change “(effective installed)” to “(effective installed [see Table A-20])”.

- 79 **TABLE A-14 (Section A5.3), Assembly U-Factors for Steel Joist Floors.** In the second column change the cavity insulation effective installed R-values as follows:

Under heading “**Steel Joist Floor with Spray-on Insulation**” change

“R-0.71 (0.71)” to “R-0.70 (0.68)”

“R-1.41 (1.41)” to “R-1.41 (1.32)”

“R-2.12 (2.12)” to “R-2.11 (1.90)”

“R-2.82 (2.82)” to “R-2.82 (2.45)”

“R-3.53 (3.53)” to “R-3.52 (2.99)”

“R-4.23 (4.23)” to “R-4.23 (3.46)”

Under the heading “**Steel Joist Floor with Batt Insulation**” change

“R-1.94 (1.94)” to “R-1.94 (1.76)”

“R-2.29 (2.29)” to “R-2.29 (2.06)”

“R-2.65 (2.65)” to “R-2.64 (2.32)”

“R-3.35 (3.17)” to “R-3.35 (2.88)”

“R-3.70 (3.70)” to “R-3.70 (3.11)”

“R-4.41 (4.41)” to “R-4.40 (3.57)”

“R-5.3C (5.29)” to “R-5.3C (4.17)”

“R-5.29 (5.29)” to “R-5.28 (4.17)”

“R-6.7C (6.70)” to “R-6.7C (4.95)”

“R-6.70 (6.70)” to “R-6.69 (4.95)”

- 90 **Normative Appendix B.** At the end of the existing paragraph, add the following: “The following definitions apply: ci = continuous insulation (see Section 3.2), NR = no (insulation) requirements.”

- 91- **TABLES B-1 through B-26, Building Envelope Requirements.** To be
116 consistent with TABLE A-16, in Tables B-1 through B-26, under the first column titled “**Opaque Elements**”, for “*Slab-On-Grade Floors*”, for Nonresidential, Residential, and Semiheated, under the heading “**Insulation Min. R-Value**”, change the following values as applicable:

“30.5 cm” to “300 mm”

“61.0 cm” to “600 mm”

“91.4 cm” to “900 mm”

“122 cm” to “1200 mm”

- 91- **Tables B-1 to B-26.** Reformat all six columns titled “Assembly Maximum” and
116* Insulation Min. R-Value” so the values are aligned left.

- 111 **Table B-21, Building Envelope Requirements (HDD18: 5001-6000, CDD10: 1001+).** Under **Fenestration**, Vertical Glazing 10.1-20 % of Wall, in the second column (under Nonresidential) titled “**Assembly Max. SHGC (All Orientations/North-Oriented)**”, change “SHGC_{all}-0.46” to “SHGC_{all}-0.36” and

“SHGC_{north}-0.36” to “SHGC_{north}-0.46”.

122 **Normative Appendix C, Section C6.8.2, Cooling Factor.** In Equation C-14, in the equation for CLG, change “G₂” to “G²”.

125 **Section C6.10.1.** Change Equation C-20 from

$$\text{“U-factor} = 1/((\text{C-factor}) + 0.85 + R_{\text{soil}})\text{”}$$

to

$$\text{“U-factor} = 1/(1/(\text{C-factor}) + 0.15 + R_{\text{soil}})\text{”}.$$

The following errata applies to **Table D-1, U.S. Climate Data**, which starts on page 125:

- 125* Move the title and introductory paragraph for Normative Appendix D, Climate Data, from the bottom of page 125 to the top of page 126 just prior to the start of Table D-1, U.S. Climate Data.
- 138* New Jersey (NJ): Shown as subheadings for New Hampshire. The state heading should be moved further left with a horizontal line inserted above.

The following errata apply to **Table D-3, International Climatic Data**, which starts on Page 152.

- 152* Change the second column heading to “Province or Region” (throughout table).
- 157* Puerto Rico: Insert “66.0” into Longitude column, move “3” from Longitude column to Elevation column, move “0” from Elevation column to HDD18 column, and move “6,337” from HDD18 column to CDD10 column.